KING COUNTY CONVEYANCE SYSTEM IMPROVEMENT PROJECT

TASK 210

SOUTH SAMMAMISH BASIN PLANNING SUMMARY

October 2003

SOUTH SAMMAMISH BASIN
PLANNING SUMMARY

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PLANNING SUMMARY

The Conveyance System Improvement project's Task 200 series of reports on the South Sammamish Basin investigates the regional wastewater service needs for sewer basins located near the south end of Lake Sammamish. The first three reports, Tasks 210, 220 and 230, contain background information on existing wastewater service, wastewater facilities and natural environment. The final three reports, Tasks 240, 250 and 260, propose, analyze and refine a set of alternatives to meet the wastewater needs in the basin throughout the planning window, which extends from 2000 to 2050.

This Task 210 report contains a broad overview of the service area's planning history and current issues. The first section describes the geography and land use in the basin and identifies the local agencies that collect wastewater and discharge it to the King County Wastewater Treatment Division (WTD) conveyance system. The following section contains a historical review of wastewater planning for the service area, dating back to the 1958 *Metropolitan Seattle Sewerage and Drainage Survey*, and includes a description of major phases of sewer development and facilities expansion. The next sections of the report focus on future planning issues, such as population growth, coordination with the *Regional Wastewater Services Plan* (*RWSP*), and the impacts associated with the Growth Management Act. The final section summarizes the primary wastewater service issues as identified during telephone interviews with local agency staff and meetings with King County WTD staff.

PLANNING AREA DESCRIPTION

The South Sammamish Basin is located in central King County around the southern half of Lake Sammamish. The basin covers about 30,000 acres or nearly 48 square miles. Figure 1 shows the geographical extent of the basin.

Local Sewerage Agencies Serving the Basin

King County WTD wastewater facilities in the basin collect flows from the Sammamish Plateau Water and Sewer District (Sammamish Plateau WSD) on the east side of Lake Sammamish, the City of Issaquah at the south end of the lake, and parts of the City of Bellevue to the west of Lake Sammamish. King County WTD wastewater basins are shown on Figure 1.

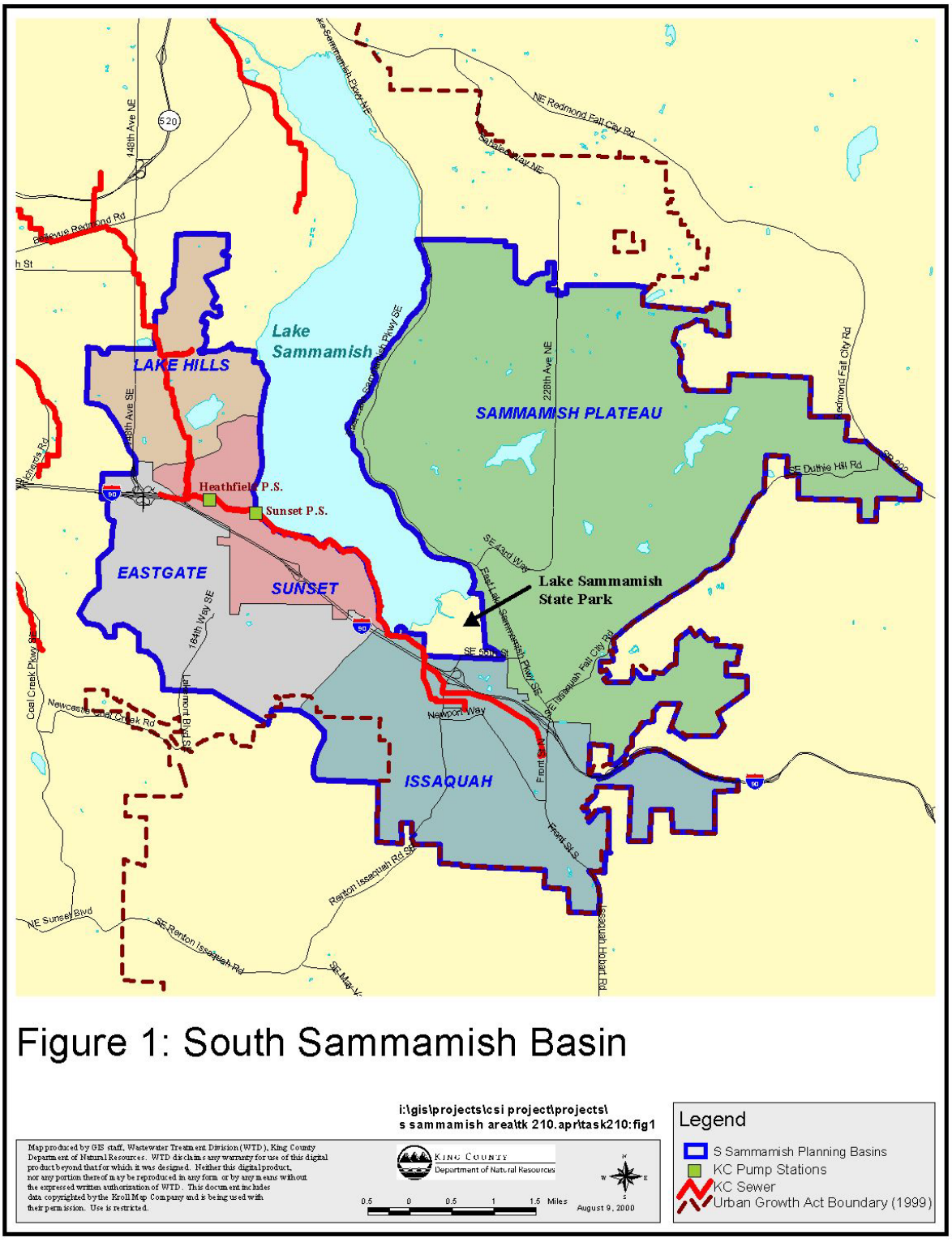

Figure 1: South Sammamish Basin

Basin Topography, Groundwater and Surface Water Characteristics

Lake Sammamish lies in the Puget Sound lowlands, an area between the Cascade and Olympic Mountain ranges that was carved away during the Vashon glaciation about 10,000 to 12,000 years ago. Much of the basin east and west of the lake is relatively flat, but steep slopes (from 20 to 40 percent) predominate at the south end of the lake, near Issaquah and Eastgate. In the south, the basin elevation varies from over 1,900 feet at the top of Squak Mountain in Issaquah to 26 feet along the Lake Sammamish shoreline.

The topography of the basin directly influences the pattern of development. Steep slopes preclude development in parts of the basin, forcing that development to the flatter areas along the lake, along stream valleys, and on the upland plateaus. Issaquah and the Sammamish Plateau drain to the low point in the basin along the lake, where wastewater must then be pumped as part of the regional conveyance system. Steep slopes pose challenges for wastewater conveyance system planners, as only a limited number of suitable force main alignments are available. Numerous sensitive areas and extensive shoreline within the basin further complicate conveyance system planning.

Wastewater conveyance systems must also cope with high seasonal groundwater and surface water at the lower basin elevations. For example, during the winter months, groundwater is frequently above the crowns of many of the sewers in downtown Issaquah, resulting in high levels of infiltration into the Issaquah Interceptor. During storm events, streams occasionally overflow their banks and may overtop local manholes, resulting in inflow into sewers. During the winter months, the level on Lake Sammamish rises, and during some larger storms, the lake surface to has overtopped manholes in the local system, resulting in more inflow into the system.

Planning Area Land Use

The planning area is currently predominantly zoned for residential development, but substantial commercial areas exist in downtown Issaquah, near the Eastgate interchange in Bellevue, and along 228th Avenue in Sammamish. The degree of urbanization presently existing in the basin varies within the planning area. Being the closest of the local sewerage agencies to Seattle, Bellevue is the most fully developed. Except for the Eastgate and Cougar Mountain sub-basins at the south edge of Bellevue's service area, all of Bellevue within the South Sammamish Basin has been developed for some time.

Until the Interstate 90 freeway was constructed in the 1970s, Issaquah was a small agricultural and coal mining center. Issaquah began to experience rapid growth in 1980s, as the areas closer to Seattle developed and the new freeway improved the commute from Issaquah to downtown Seattle. Issaquah continued its rapid growth into 1990s, and currently planned developments suggest growth will continue for the next 20 years. Issaquah officials expect the city to have reached saturation by 2020 and expect growth to slow substantially thereafter.

Historically, Lake Sammamish acted as a barrier to commuters. As a result, the urbanization of the Sammamish Plateau has lagged behind Bellevue and Issaquah. With rising real estate prices in Bellevue and Issaquah, eastside urban growth pressures shifted to the Sammamish Plateau in the late 1980s. The incorporation of the new City of Sammamish in 1999 is a reflection of this accelerated residential and commercial growth in the area.

WASTEWATER CONVEYANCE WITHIN THE BASIN

On the east side of the planning area, local agency wastewater collection systems generally flow towards the south end of Lake Sammamish, in Issaquah. From there, the King County regional system conveys flows to northwest, along Lake Sammamish and Bellevue. Major King County wastewater facilities serving the South Sammamish Basin include (from upstream to down) the Issaquah Creek Interceptor, Issaquah Interceptor, the Sunset and Heathfield Pump Stations, the Eastgate Trunk, the Lake Hills Boulevard Siphon, and the Lake Hills Interceptor (Figure 2). Wastewater from the basin eventually flows to the Eastside Interceptor, which conveys those flows to the King County WTD South Treatment Plant at Renton for treatment and discharge. This section briefly describes major facilities, but the Task 220 report contains a more detailed discussion.

The King County WTD Issaquah Creek Interceptor was built in 1982. The 21-inch diameter gravity pipeline intercepts flow from the Issaquah Creek drainage basin south and east of downtown Issaquah, and discharges that flow to the Issaquah Interceptor south of Interstate 90 near the intersection of NW Poplar Way and 19th Avenue NW.

The King County WTD Issaquah Interceptor was constructed in 1968 at a cost of approximately $2 million. The Issaquah Interceptor has two sections. Section 2 is aligned through downtown Issaquah, collecting flows from the Issaquah Creek Interceptor and the Sammamish Plateau, and discharging to Section 1 at the southern shore of Lake Sammamish. Issaquah Interceptor Section 1 is a 48-inch diameter line aligned within the lake that conveys flow from the Sammamish Plateau, Issaquah and Bellevue's Metro 57 sub-basin to the Sunset Pump Station.

The sewer that connects the Sammamish Plateau WSD to King County WTD is being replaced. The new interceptor, which will discharge to the same Issaquah Interceptor manhole as the current connection, is scheduled to be operating by late 2003. Three design alternatives have been proposed for this pipeline, but a preferred alternative has yet to be selected. According to local agency flow projections, the proposed 22.2 mgd capacity is adequate to handle all wastewater flows after the District is fully developed to current zoning, and the areas that are currently served by on-site treatment systems have been connected to sewers.

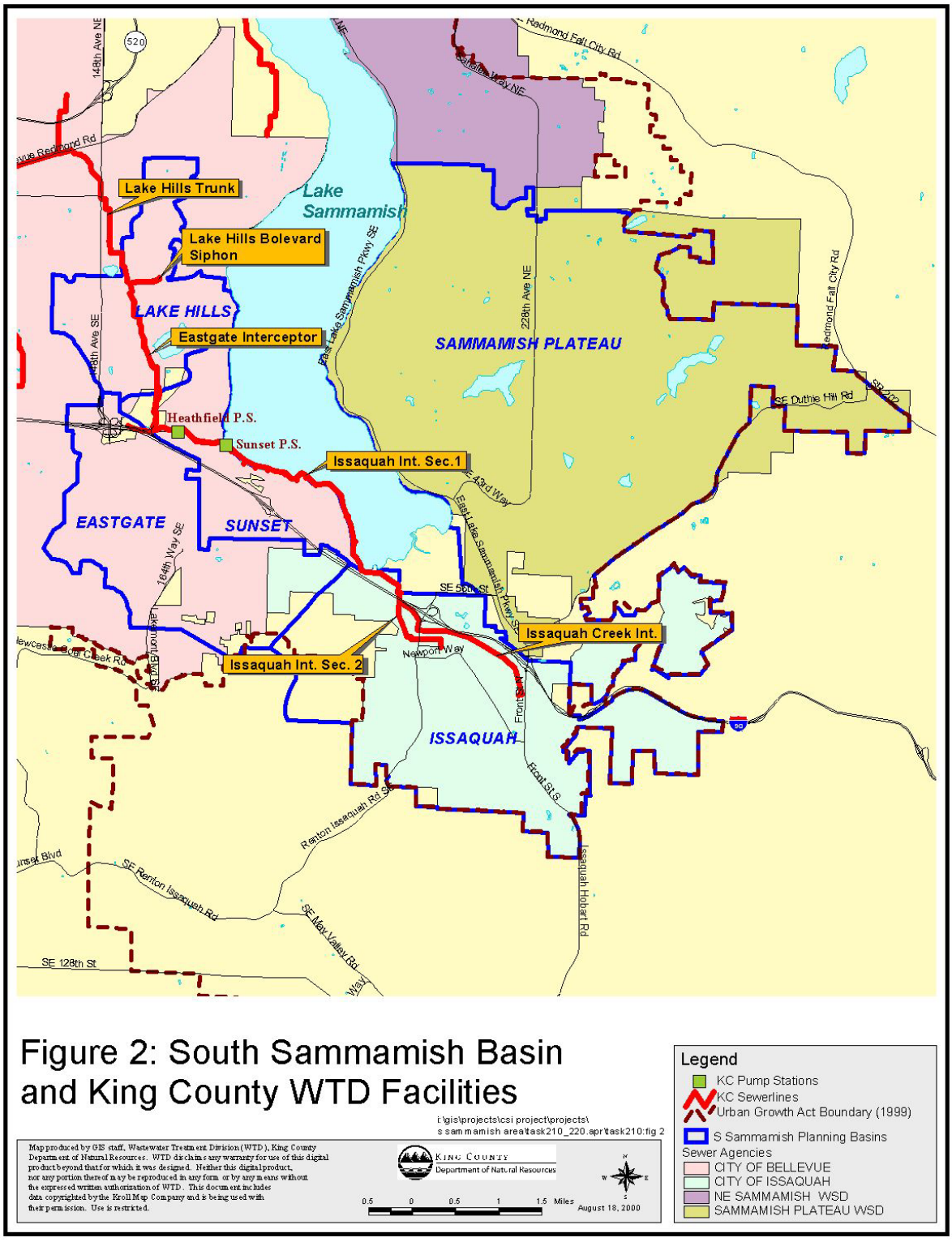

Figure 2: South Sammamish Basin and King County WTD Facilities

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Map produced by GIS staff, Wastewater Treatment Division (WTD), King County Department of Natural Resources. WTD disclaims any warranty for use of this digital product beyond that for which it was designed. Neither this digital product, nor any portion there of may be reproduced in any form or by any means without the expressed written authorization of WTD. This document includes data copyrighted by the Kroll Map Company and is being used with their permission. Use is restricted.

KING COUNTY
Department of Natural Resources

0.5 0 0.5 1 1.5 Miles

August 18, 2000

Legend

- KC Pump Stations
- KC Sewerlines
- Urban Growth Act Boundary (1999)
- S Sammamish Planning Basins

Sewer Agencies

- CITY OF BELLEVUE
- CITY OF ISSAQUAH
- NE SAMMAMISH WSD
- SAMMAMISH PLATEAU WSD

King County WTD's Sunset Pump Station, located in Bellevue near Vasa Park, along the western shore of Lake Sammamish, receives wastewater from the Issaquah Interceptor and Bellevue's Vasa Park and Sammamish sub-basins. The station pumps wastewater to the Heathfield Pump Station via parallel 3,200 and 3,400 foot long force mains. The Heathfield Pump Station conveys flows in two parallel 1,650 foot long force mains to the Eastgate Trunk sewer. The stations are virtually identical in terms of equipment, and each has a 24 mgd capacity. While the stations have adequate capacities to handle current basin flows, they are not sized to convey build-out level flows from their tributary area. As the new Sammamish Plateau WSD connection sewer nears its 22.2 mgd capacity, it will consume essentially all of the Sunset and Heathfield Pump Station capacities, leaving almost no additional capacity for Issaquah and Bellevue's Vasa Park and Sammamish sub-basins.

Flow from the Eastgate Trunk combines with wastewater from twin 10-inch diameter Lake Hills Boulevard Siphon pipes (which drain part of Bellevue's Lake Hills sub-basin) and discharges to the Lake Hills Interceptor at Lake Hills Boulevard. The Lake Hills Interceptor conveys all of the South Sammamish Basin flows out of the basin to the Eastside Interceptor and then to the King County WTD South Plant at Renton.

BASIN WASTEWATER PLANNING HISTORY AND GROWTH PATTERNS

This section provides an overview of wastewater planning history and development issues in the South Sammamish Basin. First, there is a review of growth patterns over the past several decades and discussion of population forecasts prepared by both King County and the local agencies in the basin. Next, the basin's planning history is summarized through a listing of relevant documents and reports. The bibliography is followed by a discussion of how the CSI planning fits within the framework of other current regional programs, such as the RWSP and the Growth Management Act.

Over the last 20 years, the South Sammamish Basin has been one of the most rapidly developing parts of King County. King County's *2000 Annual Growth Report* contains historic growth rates for the three South Sammamish Basin communities (Sammamish, Issaquah, and Bellevue) and shows that the planning area has been growing at a much faster rate than the average growth rate for King County. Between 1990 and 1999, Bellevue grew by 22 percent (after growing 18 percent in the 1980s). Sammamish grew by 32 percent during the 1990s. Issaquah grew by 41 percent in the 1980s and by 32 percent during the 1990s. King County-wide growth during the 1990s was about 11 percent.

Future growth will not be uniform throughout the planning area. The Bellevue area of the basin has almost entirely been developed (to a mostly single family, suburban density) and growth has slowed. By contrast, Issaquah and the Sammamish Plateau have large tracts of undeveloped or sparsely developed land served by on-site systems that are predicted to develop in the next two decades and will be connected to the KC WTD system. This pattern of growth will increase wastewater inputs to the upstream sections of the County's conveyance system.

King County and Puget Sound Regional Council Population Forecasts

King County, and its predecessor, Metro, have been making population forecasts for the South Sammamish Basin since at least the 1958 *Metropolitan Sewerage and Drainage Survey*. The 1982 *Sunset/Heathfield Pumping Stations System Improvements Engineering Evaluation* Project looked at three growth scenarios for the basin, and the January 1990 Metro *Renton Service Area Population and Flow Study* forecasted saturation populations for all of the sub-basins in the Renton service area, including the South Sammamish Basin.

The Puget Sound Regional Council (PSRC) prepares population and employment forecasts for use by local governments in King County and are the continuing basis for KCWTD's forecasting and flow projection efforts.[1] For example, 1991 PSRC forecasts were used by planners in 1994 for the *Regional Wastewater Services Plan* (*RWSP*) as they prepared an updated comprehensive wastewater plan for King County and adjoining service areas.

August 2000 population forecasts (the latest available) from the PSRC and extrapolated by King County WTD (hereafter referred to as the "August 2000 PSRC/KCWTD forecasts") indicate that the current residential population in the South Sammamish Basin is about 74,452 (Table 1). These latest forecasts also indicate that the rapid growth that has taken place within the basin over the last 30 years will moderate to an average of less than one percent annually through 2030. The PSRC/KCWTD forecasts indicate the residential population of the South Sammamish Basin will grow to about 89,000 by 2030, and 100,500 by 2050.

Table 1. August 2000 PSRC/KCWTD South Sammamish Basin Forecasts

Forecast for Year 2000

Planning Basin	Sub-Basin Area[a] (acres)	Residential Population	Commercial Employees	Industrial Employees
Lake Hills	1,910	13,471	7,217	409
Eastgate	3,045	14,139	3,413	308
Sunset	1,571	9,287	3,239	2,440
Issaquah	6,170	9,432	7,130	1,011
Sammamish Plateau	10,816	28,123	6,353	204
Totals	23,512	74,452	27,352	4,372

Forecasts for Year 2050

	Sub-Basin Area[a] (acres)	Residential Population	Commercial Employees	Industrial Employees
Lake Hills	1,910	13,940	9,848	453
Eastgate	3,045	19,652	4,925	305
Sunset	1,571	10,953	4,230	2,405
Issaquah	6,170	14,096	12,231	1,331
Sammamish Plateau	10,816	41,894	10,978	617
Totals	23,512	100,535	42,212	5,111

a. Sub-basin area includes only those portions of the basin inside the Urban Growth Area Boundary.

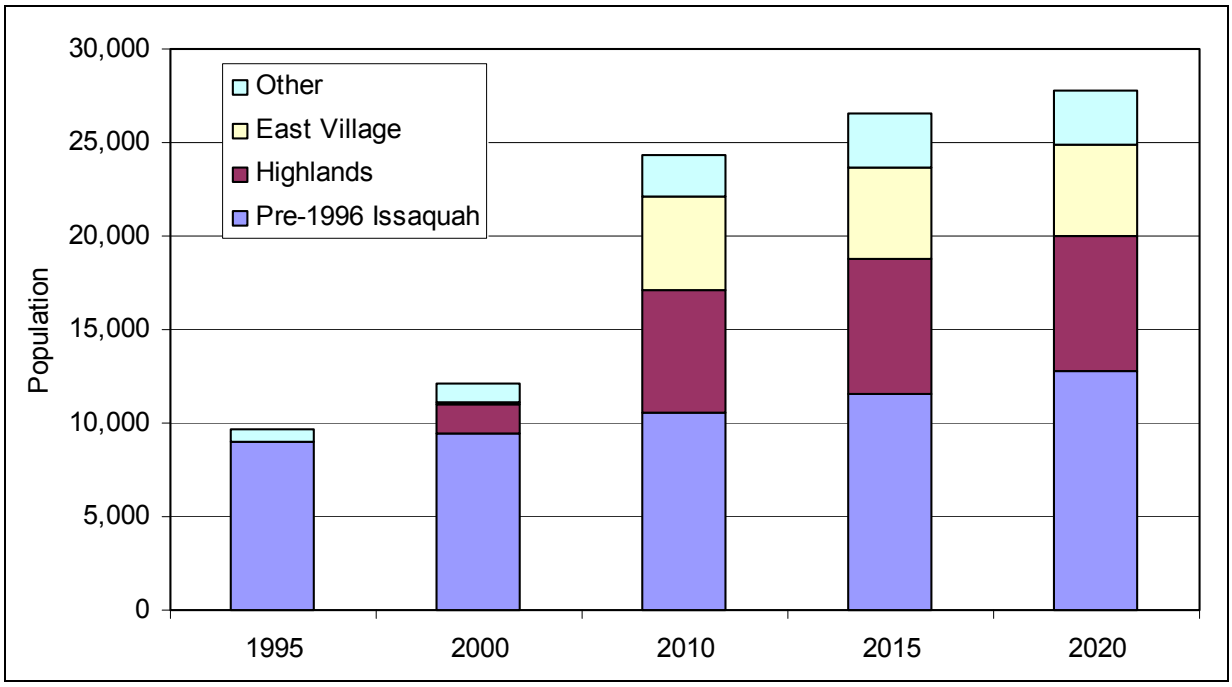
[1] For a description of the methodology used by King County to develop basin population forecasts, see Appendix A.

Local Sewer Agency Expectations

Local sewer agencies that serve the South Sammamish Basin must plan to meet their own immediate and long-term agency needs. Those agencies have developed population forecasts for their own jurisdictions.

The King County forecasts for Bellevue compare favorably with the growth expectations of Bellevue utilities' personnel. The portion of the basin served by Bellevue is more fully developed, and local officials forecast that population growth, especially within the Lake Hills sub-basin, will be slow. The Sunset and Eastgate sub-basins have pockets of undeveloped land that are expected to fill quickly, within the next five to ten years, but overall, the Bellevue sub-basins are expected to follow the growth pattern forecasted by the PSRC.

The City of Issaquah planning department forecasts that Issaquah's population will continue to grow rapidly for another 20 years before the growth rate slows and the population levels off. These growth forecasts are in contrast to the PSRC/KCWTD, which forecasts a steady, slower growth pattern throughout the planning period. The Issaquah officials base their expectation on normal population infill along with two major Planned Unit Developments (PUDs) (the Highlands and East Village) and several other, smaller developments planned or currently being constructed in and around the city. PUDs result in growth spikes that, although difficult to foresee, greatly impact population totals. Figure 3 and Table 2 illustrate the impact that Issaquah planning department believes such new developments will have on the city's population.



Note: "Other" includes Parkpointe, Bergsma, Tibbetts Cr. Valley, Lakemont Triangle, East Cougar Mountain, and Issaquah 69.

Figure 3. Major Issaquah Planned Developments

Table 2. City of Issaquah's Forecast of Sewered Residential Population

Development	2000	2010	2015	2020
Pre 1996 Issaquah	9,492	10,513	11,607	12,815
Issaquah Highlands	1,551	6,600	7,150	7,150
Parkpointe	0	792	1,272	1,272
Bergsma	0	94	94	94
East Village	55	4,950	4,950	4,950
Tibbetts Creek Valley	68	83	91	100
Lakemont Triangle	800	948	948	948
East Cougar Mountain	152	193	223	232
Issaquah 69	0	142	171	171
Totals	12,118	24,315	26,506	27,732

Sammamish Plateau WSD also makes population forecasts in order to determine its future capital facilities needs. Sammamish Plateau WSD is presently planning a new interceptor (designated the "King County Extension") to convey District flows to King County's Issaquah Interceptor. Local facilities planning for the King County Extension assumes an *annual* growth rate of 9.8 percent (to a 2014 population of 30,480 equivalent residential units (ERUs), including residential and non-residential use), based on the number of sewer accounts shown on the District's quarterly reports to King County WTD from 1992 through 1996. The District's comprehensive sewer planning, also presently underway, assumes a more modest growth rate, to 24,735 ERUs (including residential and non-residential populations) by 2015. The forecasts for the comprehensive plan update are based on the District estimation of the development potential of virtually every tract within the District's jurisdiction. Table 3 below summarizes Sammamish Plateau WSD's comprehensive planning forecasts.

Table 3. Sammamish Plateau WSD Sewered Residential Population Forecasts (in ERUs)

	1999	2005	2015
Single Family Residential	5,532	9,968	21,671
Multi-Family Residential	1,528	2,190	3,064
Total Residential Population	7,060	12,158	24,735

Essentially all of the City of Issaquah is sewered, but not all the sewer service is provided by the City of Issaquah. The North Issaquah annexation area includes a substantial sewered population (about 1,529 residents in 2000 and growing to as many as 4,490 residents by 2020); that population receives its sewer service from the Sammamish Plateau WSD. The Issaquah basin totals do not include Issaquah residents served by Sammamish Plateau WSD. Also, the Issaquah Highlands has historically been shown as included in the Sammamish

Plateau sub-basin. The Highlands actually drains to Issaquah's collection system, however, and therefore the Highlands population has been included as part of Issaquah's forecast, not the forecast for the Sammamish Plateau WSD.

Comparison of PSRC/KCWTD and Local Agency Forecasts

While King County and the local agencies in the South Sammamish Basin share similar views about past population growth rates, in assessing their own local wastewater service needs, Issaquah and the Sammamish Plateau's planning departments forecast higher growth rates of the next 20 years than King County. Bellevue agrees that the PSRC/KCWTD reasonably forecasts future growth in its service area.

Figure 4 compares the PSRC/KCWTD and City of Issaquah population forecasts. The Issaquah planning group's forecasts show initially higher growth than King County, due to the development of the East Village and Issaquah Highlands areas. In interviews, Issaquah staff have indicated that they expect the city population to stabilize with slow growth typical of infill and small-site redevelopment after 2020. Because the city has not published population forecasts that extend beyond 2020, we assumed for Figure 4 that Issaquah's population will grow at the PSRC/KCWTD rate (of less than 1 percent annually) from 2020 to 2050.

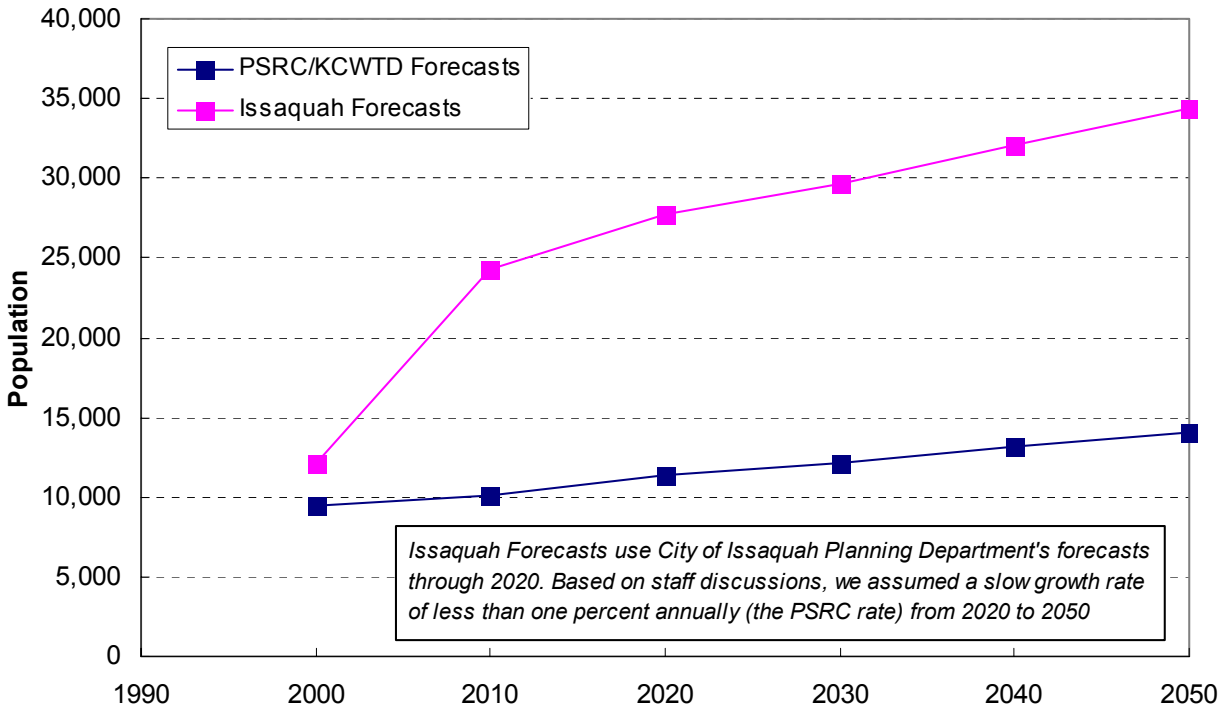


Figure 4. Comparison of Residential Population Growth Forecasts for Issaquah

The key difference between the PSRC/KCWTD and Issaquah forecasts is the direct inclusion of the East Village and Issaquah Highlands developments by the local agency. While the Issaquah planning group receives local development applications and uses these to assess the sewering needs within Issaquah alone, the PSRC must prepare forecasts that are accurate at a regional scale for use in regional-scale planning issues. The two sets of forecasts reflect the needs and methods of the agencies involved and together form a range of development possibilities, which will probably contain the actual growth pattern experienced in the future.

The differences in the population forecasts would affect projections of base wastewater flow, but would have a smaller impact on project peak storm flows. During large storms, most of the wastewater flow is composed of I/I, not base flow. The amount of I/I entering the sewer system is more closely related to the sewering extent than the number of people connected to the sewer system, and King County and the City of Issaquah agree on the amount of the basin that will be sewered in the future. KC WTD should consider the local and County forecasts as a range of possible growth scenarios and prepare flow projections for each.

Figure 5 graphically illustrates the PSRC/KCWTD and Sammamish Plateau WSD planning officials' expectations concerning future residential growth on the Sammamish Plateau. The forecasted ERUs shown in Table 3 were converted to population assuming 2.75 people per residential ERU. The Sammamish Plateau WSD anticipates that the population for 2020 and beyond will be approximately double the PSRC/KCWTD population forecasts. A difference of that magnitude will produce a difference of about 2 mgd between base flow projections based on the PSRC/KCWTD forecasts and base flow projections based on Sammamish Plateau WSD's own population forecasts. Both King County and the Sammamish Plateau agree on the expected sewered area in 2020 and after, so the difference in forecasted population will not affect projected I/I volume in the basin. Similar to the Issaquah discussion above, the different population forecasts will affect the projected base flow, but base flow is the smaller of the two components (base flow + I/I) that make up the peak storm flow.

The two curve slopes during the period between 2000 and 2020 are not directly comparable. Whereas the PSRC/KCWTD line shows forecasted population within the basin, the steeper Sammamish forecast line is based on sewered population. As of 2000, the District has almost twice as many water accounts as sewer accounts, suggesting that much of the District uses septic systems for sewage treatment. Over the next 20 years, the District expects that these non-sewered customers will gradually hook up to public sewers. The District's steeper growth curve, in part, reflects this conversion. By 2020, the District assumes that it will be 100 percent sewered, and the difference in the population forecasts from 2020 onward reflect a difference in forecasted population. Thus the difference in the slope of the two curves over the next 20 years is less critical compared to the difference in the two data points representing the 2020 population. The data points beyond 2020 on the Sammamish forecast curve assume that growth beyond 2020 will take place at the PSRC/KCWTD-projected rates.

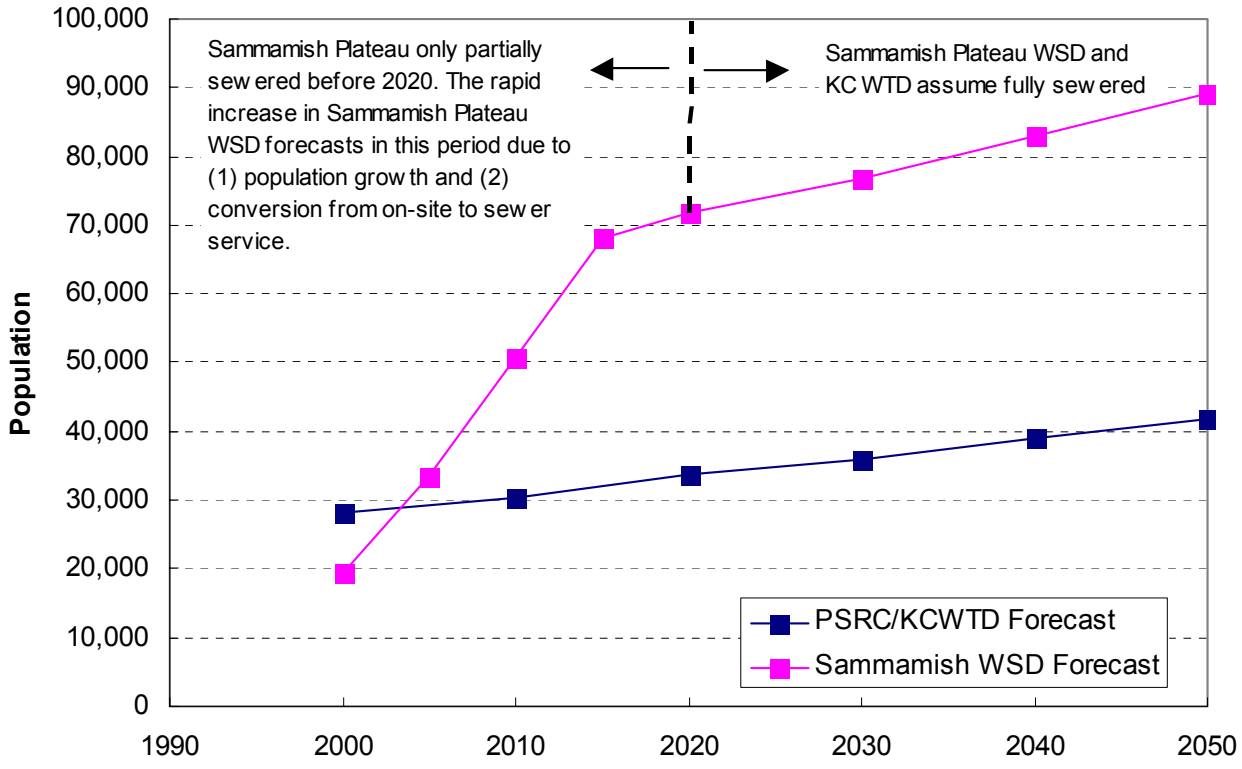


Figure 5. Comparison of Residential Population Growth Forecasts for the Sammamish Plateau WSD

The difference between the forecasts prepared by Issaquah and Sammamish Plateau WSD and Issaquah and the forecasts prepared by the PSRC is explained in part by the difference in forecasting methodology used. The PSRC begins with regional economic and employment information and then disaggregates the employment location information into smaller and smaller geographical units. In contrast, Issaquah and Sammamish Plateau WSD first make forecasts for small geographical units (e.g., neighborhoods, subdivisions, or PUDs) based on actual counts and development plans and then aggregate the neighborhood or PUD forecasts into a district forecast.

Figure 6 is a summary plot that shows the PSRC/KCWTD and local agency residential population forecasts for the entire basin for the period 2000 through 2050. The growth curve for the local sewerage agencies was prepared from each agency's own facility and comprehensive planning and from information gathered during interviews with local agency staff. Table 4 compares the population forecasts for the South Sammamish Basin as developed by the PSRC and King County WTD with the forecasts developed by the local agencies.

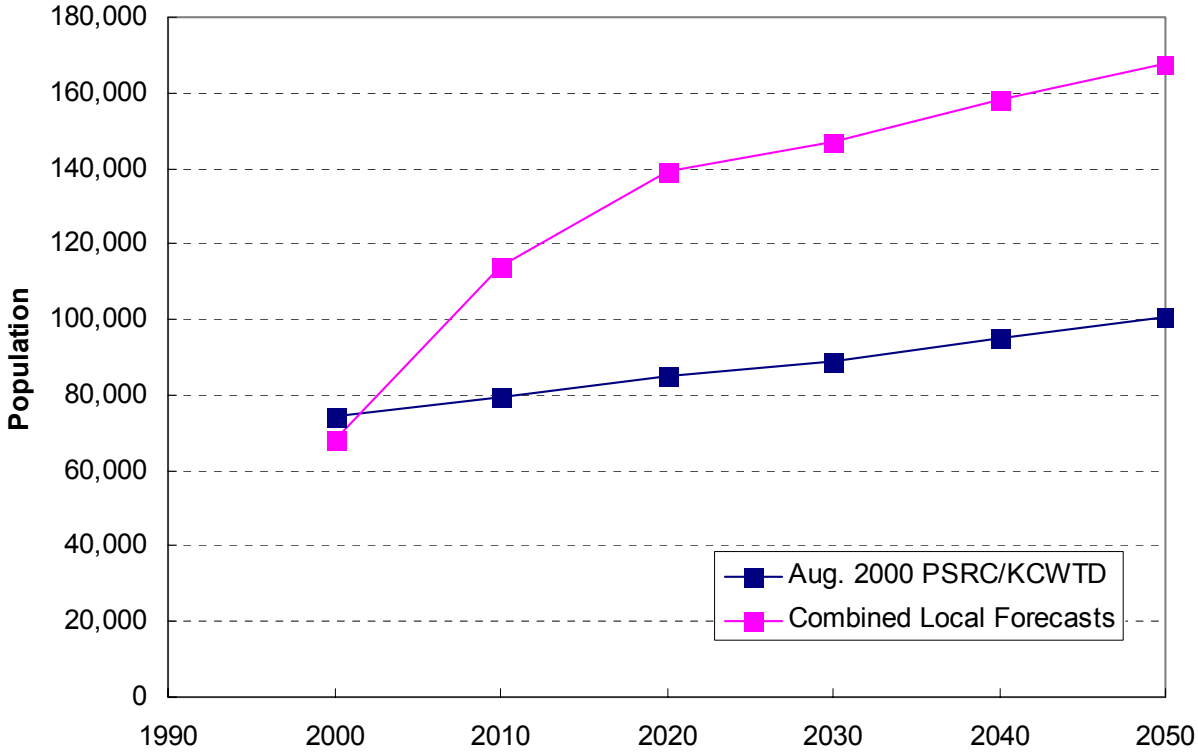


Figure 6. Comparison of PSRC/KCWTD and Local Sewer Agency Residential Population Growth Forecasts for the South Sammamish Basin

Table 4. South Sammamish Basin Base Data Sheet

Year 2000 Forecasts Based on August 2000 PSRC/KCWTD Data

Planning Basin	Sub-Basin Area (acres)	Residential Population	Commercial Employees	Industrial Employees
Lake Hills	1,910	13,471	7,217	409
Eastgate	3,045	14,139	3,413	308
Sunset	1,571	9,287	3,239	2,440
Issaquah	6,170	9,432	7,130	1,011
Sammamish Plateau	10,816	28,123	6,353	204
Totals	23,512	74,452	27,352	4,372

Year 2050 Forecasts Based on August 2000 PSRC/KCWTD Data

Planning Basin	Sub-Basin Area (acres)	Residential Population	Commercial Employees	Industrial Employees
Lake Hills	1,910	13,940	9,848	453
Eastgate	3,045	19,652	4,925	305
Sunset	1,571	10,953	4,230	2,405
Issaquah	6,170	14,096	12,231	1,331
Sammamish Plateau	10,816	41,894	10,978	617
Totals	23,512	100,535	42,212	5,111

Year 2050 Residential Forecast Based on Issaquah and Sammamish Plateau WSD Planning

Planning Basin	Sub-Basin Area (acres)		Future Population per Local Agency Planning	2050 Population as per Local Agency Forecasts
Lake Hills	1,910		12,465 RE [a]	13,940
Eastgate	3,045		9,821 RE [a]	19,652
Sunset	1,571		33,211 RE [a]	10,953
Issaquah	6,170		34,330 [b]	34,330 [b]
Sammamish Plateau	10,816		24,735 ERU [c]	89,027 [c]
Totals	23,512			167,902

[a] REs are "residential equivalent" from 1994 *Bellevue Comprehensive Sewer Plan.* RE use = 75 g/RE/day. Future = "saturation" according to 1995 *Bellevue Comprehensive Sewer Plan.*

[b] Future = 2020 *per Issaquah Sewer Plan, 1999 Update.* Extrapolated to 2050 using PSRC/KCWTD growth rates, as per direction from King County and confirmed by Issaquah officials.

[c] Future = 2015 per Sammamish Plateau WSD sewer planning. Extrapolated to 2050 using PSRC/KCWTD rates, as per direction from King County. One ERU is assumed to equal 2.75 residents.

In summary, the comparison of population forecasts prepared by King County and those prepared by local wastewater agencies in the South Sammamish Basin show that the two local agencies with considerable remaining undeveloped land expect their populations to grow more rapidly than KC WTD until 2020. Issaquah and the Sammamish Plateau WSD forecast high growth for the next two decades as the remaining developable areas fill in, followed by slow growth. The PSRC/KCWTD forecasts a steadier growth pattern in Issaquah and the Sammamish Plateau throughout the planning periods, from 2000 to 2050.

The Bellevue part of the basin is mostly developed. Both the City of Bellevue and PSRC/KCWTD forecast slow, steady population growth through 2050.

For the CSI project, the impact of the different forecasts on wastewater service needs in the South Sammamish Basin is of greater interest than the differences in population. As stated above, the number of people connected to the sewer system affects the base wastewater contribution to the sewer, but the amount of I/I in the sewer is more closely related to the sewering extent (i.e. sewered area) in the basin. King County and the local agencies all agree on timing of sewer expansion into presently unsewered parts of the basin. Agreement on the sewered area will have a larger impact on the projected peak 20-year flow, which is the design flow for the County's conveyance facilities, because the peak 20-year flow is composed mostly of I/I (even in relatively new, tightly constructed collection systems).

When preparing flow projections for the South Sammamish Basin, KC WTD should consider the local agency and PSRC/KCWTD forecasts as representing a range of possible growth and base flow conditions. By preparing flow projections corresponding to both high and low growth conditions, the CSI project team can consider a full range of base flow and peak flow conditions for facility sizing and operation. The two sets of flow projections for Issaquah and the Sammamish Plateau will probably vary by 10 to 15 percent, or 3 to 4 mgd at the peak 20-year flow event. The difference between the high and low flow estimates could affect the size of conveyance improvement facilities, but would not have a major impact on types and numbers of alternatives considered in Task 240.

Basin Planning Chronology

Over the past 40 years, the sewer services provided in the South Sammamish Basin have expanded as the service area has grown and developed. The following chronology highlights changes to the service area and facilities since the *1958 Plan*:

- Creation of the Eastgate Sewer District in 1958.
- Construction of the Lake Hills Interceptor and abandonment of the Lake Hills treatment facility in 1964.
- Construction of the first Sunset (then Vasa Park) and Heathfield Pump Stations in 1965.
- Construction of the Issaquah Interceptor and abandonment of the Issaquah Treatment Plant in 1968.
- Abandonment of a plan for a 48 mgd Vasa Park Pump Station in the 1970s.
- Construction of the Issaquah Creek Interceptor in 1982.

- Expansion of the Eastgate trunk sewer in 1983-84, construction of 24-inch diameter force mains at Sunset and Heathfield to parallel existing 12-inch lines in 1983-84, and reconstruction of the Sunset and Heathfield Pump Stations in 1987.

- Bellevue's annexation of the Eastgate Sewer District in 1995.

Wastewater Studies and Facility Planning within the Basin

The following list summarizes, in chronological order, the available plans published since the 1958 *Metropolitan Sewerage and Drainage Survey*.

1. Metropolitan Engineers, *Lake Hills Interceptor Sewer,* 1964.

2. Metropolitan Engineers, *Issaquah Interceptor, Section 1,* 1967.

3. Metropolitan Engineers, *Issaquah Interceptor, Section 2,* 1967.

4. Metropolitan Engineers, *Predesign Report, Second Stage of Construction of Comprehensive Sewerage Plan, South Lake Sammamish Sewerage Area,* 1968.

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Regional Wastewater Services Plan Coordination

The *1958 Metropolitan Sewerage and Drainage Plan* is the basic sewerage comprehensive plan for King County and its predecessor, Metro. The *Regional Wastewater Services Plan* (*RWSP*) was adopted in November 1999 as an amendment to the *1958 Plan*. As in the past, the current amended comprehensive wastewater plan uses population and employment forecasts and wastewater flow projections based on PSRC data.

The final *RWSP* adopted by the Council called for no new major projects within the South Sammamish Basin. Capacity problems that are projected in the regional conveyance system were identified as minor trunk improvements in the amended plan. The plan assumed that all basin flows would continue to be routed to the Lake Hills and Eastside Interceptors with minor trunk improvements scheduled through 2030. By 2005 to 2010, when the Eastgate sub-basin in Bellevue has reached buildout and Issaquah and Sammamish Plateau sewered populations may have doubled, parts of the existing system will be further stressed.

Growth Management Impacts

The eastern part of the South Sammamish Basin lies within urban growth boundary under current King County Comprehensive Plan, incorporating tenants of the Washington State Growth management Act, as amended, and the subsequent Bellevue and Issaquah comprehensive land use plans. The new City of Sammamish will also be preparing its own comprehensive land use plan. The Growth Management Act and the local agency comprehensive plans all require that new development within the urban growth boundary be sewered. The City of Issaquah's ordinances require that in order to receive sewer services, the areas to be developed must agree to be annexed by the city. Sammamish Plateau WSD service area extends to the urban growth boundary; the District will provide sewer services to all newly developed areas. As the Sammamish Plateau system expands to include new developments, the areas within the urban growth boundary that are currently served by on-site systems will be required to connect to sewers. By 2020 to 2030, essentially all development in the planning area lying within the urban growth boundary should be connected to King County sewers for treatment at one of the regional treatment facilities. That assumption is consistent with the assumption that the *RWSP* planners made that by 2020, all residential population and employment within the urban growth boundary would be 100 percent sewered.

Affected agencies are required to prepare plans to finance and construct the new development that will occur for the next 10 to 20 years. Bellevue and Issaquah have completed sewer plan updates within the last five years that provide for facilities to serve areas planned for development, and Sammamish Plateau WSD is currently updating its 1987 comprehensive sewer plan. The agencies expect that the local facilities necessary to convey their 20-year peak flows will be in place by the time they are needed. To convey these peak flows from the local agencies to treatment facilities, King County WTD will have to upgrade existing regional facilities, plan new facilities, and/or redirect flows to accommodate the increased demand for sewage conveyance and treatment services.

PLANNING AREA ISSUES AND PROBLEMS

The following list briefly summarizes areas of concern in the South Sammamish Basin:

1. Rapid growth in the basin will cause the King County WTD conveyance flows to exceed capacity within the next 20 years. Capacity in the Issaquah Creek Interceptor will likely be exceeded in as little as ten years.

2. Issaquah and Bellevue staff indicates that many of their existing sewers are old and show signs of deterioration. As a result, infiltration and inflow (I/I) may be increasing over time. During wet weather periods, much of the sewer systems in the Bellevue lakeside sub-basins and in downtown Issaquah are below the groundwater table, generating the opportunity for excessive I/I into the County's Issaquah Interceptor. During high water, the Lake Sammamish level may overtop some local service and King County manholes (as it has on at least three occasions, the last occasion being in December 1996), resulting in additional wet weather inflow. Issaquah has undertaken I/I removal projects (e.g., sliplining city trunk sewers in downtown). Bellevue's comprehensive sewer plan noted the need to monitor flows to determine if I/I is a problem in its system as well. Such I/I removal projects have the potential to reduce the need for additional conveyance facilities to serve the basin. A 1995 study of I/I problems in Kent and Issaquah by Brown and Caldwell concluded that renovation of the trunk sewers may not solve Issaquah's I/I problem because much of the I/I comes from leaking private lateral sewers upstream of the trunk sewers. Therefore, it seems likely that additional conveyance will have to be provided to move South Sammamish Basin wastewater out of the basin for treatment.